

**CLAIMS**

What is claimed is:

- 1 1. A method for a controlled release of structures  
2 comprising:  
3 a) forming one or more trenches in a layer of device  
4 material;  
5 b) filling the trenches with an etch-stop material;  
6 c) defining one or more structures between selected  
7 filled trenches; and  
8 d) etching one or more portions of the device layer  
9 between the filled trenches to release the  
10 structures, wherein the etching does not etch the  
11 etch-stop material.
- 1 2. The method of claim 1, wherein b) includes depositing  
2 etch-stop material over the surface of the device  
3 layer.
- 1 3. The method of claim 2 wherein c) includes  
2 forming one or more openings in the etch-stop  
3 material that has been deposited over the  
4 surface of the device layer.
- 1 4. The method of claim 2, wherein the etching  
2 undercuts one or more portions of the etch-stop  
3 material that has been deposited over the  
4 surface of the device layer.
- 1 5. The method of claim 1 where the layer of device  
2 material is disposed between two layers of etch-stop  
3 material.

- 1           6.    The method of claim 1, wherein the device layer  
2               includes one or more layers of a silicon-on-insulator  
3               (SOI) substrate.
- 1           7.    The method of claim 1, wherein the device layer is a  
2               layer of glass, quartz or oxide.
- 1           8.    The method of claim 1, wherein d) includes a wet etch  
2               process.
- 1           9.    The method of claim 1, wherein d) includes a dry etch  
2               process.
- 1           10.   The method of claim 1, further comprising: forming a  
2               structural layer proximate one or more of the exposed  
3               areas of the device layer.
- 1           11.   The method of claim 10, wherein the etch process  
2               in d) does not etch the structural layer.
- 1           12.   The method of claim 10, further comprising  
2               releasing one or more portions of the structural  
3               layer.
- 1           13.   The method of claim 10, wherein the etch process  
2               in d) releases one or more portions of the  
3               structural layer.
- 1           14.   The method of claim 10, wherein the structural  
2               layer includes one or more structures that are  
3               formed directly on top of the etch-stop layer.
- 1           15.   The method of claim 14, wherein the structural  
2               layer contains two or more sub-layers.
- 1           16.   A process for forming structures comprising:

- 2 i) forming one or more trenches in a layer of device  
3 material;
- 4 ii) filling the trenches with an etch-stop material to  
5 define one or more structures;
- 6 iii) masking a surface of the layer of device material to  
7 expose one or more selected areas of device material  
8 that border one or more filled trenches; and
- 9 iv) etching one or more of the selected areas of the  
10 device layer to release the structures, wherein the  
11 etching does not etch the etch-stop material.

- 1 17. A comb structure comprising
- 2 a) one or more static comb fingers
- 3 b) one or more movable comb fingers that are movable with  
4 respect to the static comb fingers; wherein the static  
5 comb fingers, the movable comb fingers, or both are  
6 formed by:
- 7 i) forming one or more trenches in a layer of device  
8 material;
- 9 ii) filling the trenches with an etch-stop material to  
10 define one or more structures
- 11 iii) masking a surface of the layer of device material  
12 to expose one or more selected areas of device  
13 material that border one or more filled trenches;  
14 and
- 15 iv) etching one or more of the selected areas of the  
16 device layer to release the structures, wherein the  
17 etching does not etch the etch-stop material.

- 1 18. The comb structure of Claim 17 wherein both the static  
2 comb fingers and the movable comb fingers are formed on  
3 the same level.

- 1 19. The comb structure of Claim 17 wherein the movable comb  
2 fingers are disposed above the static comb fingers.

1 20. A MEMS device, comprising one or more structures, wherein  
2 the structures have been formed by:

3 i) forming one or more trenches in a layer of device  
4 material;

5 ii) filling the trenches with an etch-stop material to  
6 define one or more structures;

7 iii) masking a surface of the layer of device material to  
8 expose one or more selected areas of device material  
9 that border one or more filled trenches; and

10 iv) etching one or more of the selected areas of the  
11 device layer to release the structures, wherein the  
12 etching does not etch the etch-stop material.

1 21. The MEMS device of claim 20, wherein the structures  
2 comprise one or more comb fingers.

1 22. The MEMS device of claim 20, wherein the  
2 structures include one or more electrostatic  
3 actuators.